

CLAIMS

1. (Currently Amended) A remote communication device comprising:
communication circuitry configured to at least one of receive communication signals and
generate communication signals; and
an antenna coupled with the communication circuitry, the antenna including a first
portion, a second portion and an impedance reduction portion, the first portion to
substantially tune the antenna to a first frequency band, the first and second
portions to tune the antenna simultaneously to a second frequency band different
from the first frequency band, the impedance reduction portion coupled to the first
and second portions to facilitate tuning to the first and second frequency bands;
~~the antenna being configured to communicate wireless signals corresponding to
the communication signals including at least one of receiving wireless signals and
outputting wireless signals.~~
2. (Original) The remote communication device according to claim 1 wherein the antenna
comprises a microstrip antenna.
3. (Original) The remote communication device according to claim 1 wherein the antenna is
configured to electromagnetically communicate with a return loss of less than or equal to
approximately -9 dB within the first and second frequency bands.
4. (Previously Presented) The remote communication device according to claim 1 further
comprising a power source coupled with the communication circuitry.

5. (Previously Presented) The remote communication device according to claim 1 wherein the antenna is configured to output the wireless signals, and the remote communication device further comprises another antenna coupled with the communication circuitry and substantially tuned to first and second different frequency bands, the another antenna being configured to receive the wireless signals.
6. (Previously Presented) The remote communication device according to claim 1 wherein the antenna is configured to communicate via backscatter modulation.
7. (Previously Presented) The remote communication device according to claim 5 further comprising a quarter-wavelength transmission line coupled intermediate the communication circuitry and the antenna.
8. (Original) The remote communication device according to claim 1 wherein the communication circuitry comprises radio frequency identification device circuitry
9. (Original) The remote communication device according to claim 1 wherein the frequency bands are centered at approximately 915 MHz and 2.45 GHz.
10. (Previously Presented) The remote communication device according to claim 1 wherein the first and second portions of the antenna are substantially symmetric.
11. (Currently Amended) A remote communication device comprising:
communication circuitry configured to at least one of receive communication signals and generate communication signals; and

an antenna coupled with the communication circuitry ~~and configured to communicate wireless signals corresponding to the communication signals including at least one of receiving wireless signals and outputting wireless signals~~, the antenna having a plurality of substantially resonant frequencies and an impedance reduction strip integrated within a frequency tuning portion of the antenna; and a quarter-wavelength transmission line coupled intermediate the communication circuitry and the antenna.

12. (Original) The remote communication device according to claim 11 wherein the antenna is substantially tuned to the resonant frequencies.
13. (Previously Presented) The remote communication device according to claim 11 wherein the antenna is configured to electromagnetically communicate with a return loss of less than or equal to approximately -9 dB at the resonant frequencies.
14. (Previously Presented) The remote communication device according to claim 11 wherein the antenna is configured to output the wireless signals, and further comprising another antenna coupled with the communication circuitry and configured to receive the wireless signals at a plurality of substantially resonant frequencies.
15. (Previously Presented) The remote communication device according to claim 14 wherein the antenna is configured to communicate via backscatter modulation.
16. (Previously Presented) The remote communication device according to claim 11 wherein the antenna comprises a dipole antenna with a return loss of less than -9 dB at the resonant frequencies.

17. (Original) The remote communication device according to claim 11 wherein the communication circuitry comprises radio frequency identification device circuitry.
18. (Currently Amended) A radio frequency identification device comprising:
communication circuitry configured to receive communication signals and generate communication signals according to an identification code stored to identify an object to which the radio frequency identification device is attached; and
at least one antenna coupled with the communication circuitry, the at least one antenna to
simultaneously tune to a plurality of frequency bands including a first frequency band and a second frequency band, wherein a center frequency of the second frequency band is at least twice higher than a center frequency of the first frequency band,~~the antenna being configured to communicate wireless signals corresponding to the communication signals including at least one of receiving the wireless signals and outputting the wireless signals.~~
19. (Original) The radio frequency identification device according to claim 18 wherein the antenna is configured to receive the wireless signals, and further comprising another antenna coupled with the communication circuitry and substantially tuned to a plurality of frequencies, the another antenna being configured to output the wireless signals.
20. (Original) The radio frequency identification device according to claim 19 wherein the another antenna is configured to communicate via backscatter modulation.
21. (Original) The radio frequency identification device according to claim 18 wherein the antenna includes an impedance reduction conductor.

22. (Currently Amended) A radio frequency identification device comprising:
- communication circuitry configured to receive communication signals and to generate communication signals;
 - a first antenna comprising a loop antenna coupled with the communication circuitry and simultaneously substantially tuned to a plurality of frequencies, the first antenna being configured to receive wireless signals ~~corresponding to the received communication signals;~~
 - a second antenna coupled with the communication circuitry and simultaneously substantially tuned to a plurality of frequencies, the second antenna being configured to output wireless signals ~~corresponding to the generated communication signals;~~ and
 - a battery positioned within the loop antenna to tune the loop antenna to one of the frequencies.
23. (Original) The radio frequency identification device according to claim 22 wherein the antennas are individually configured to electromagnetically communicate with a return loss of less than or equal to approximately -9 dB at individual ones of the plurality of frequencies.
24. (Original) The radio frequency identification device according to claim 22 wherein the second antenna is configured to communicate via backscatter modulation.
25. (Original) The radio frequency identification device according to claim 22 wherein the antennas individually include an impedance reduction conductor.

26. (Previously Presented) A radio frequency identification device comprising:
communication circuitry configured to receive forward signals from an interrogator and
generate return signals according to an identification code stored to identify an
object to which the radio frequency identification device is attached;
an antenna coupled with the communication circuitry and configured to communicate
wireless signals at one of a plurality of frequencies including at least one of
receiving the forward signals and outputting the return signals; and
wherein the antenna is simultaneously substantially tuned to the frequencies, but not
tuned to at least one frequency between two of the plurality of frequencies, at a
moment in time.
27. (Previously Presented) The radio frequency identification device according to claim 26
wherein the antenna is configured to communicate at one frequency responsive to a
frequency of communication of the interrogator.
28. (Original) The radio frequency identification device according to claim 26 wherein the
antenna is configured to receive the forward signals, and further comprising another
antenna coupled with the communication circuitry and configured to output the return
signals at one of a plurality of frequencies.
29. (Original) The radio frequency identification device according to claim 28 wherein the
another antenna is configured to communicate via backscatter modulation.
30. (Previously Presented) The radio frequency identification device according to claim 26
wherein the impedance reduction conductor tunes the antenna to one of the frequencies.

31. (Previously Presented) A wireless communication system comprising:
an interrogator configured to emit forward signals;
a remote communication device configured to at least one of receive the forward signals
from the interrogator and generate return signals for communication to the
interrogator, the remote communication device being configured to communicate
wireless signals including at least one of receiving the forward signals and
outputting the return signals at a plurality of frequencies using one antenna
simultaneously substantially tuned to the frequencies; and
a battery positioned to tune the antenna to one of the frequencies.
32. (Original) The wireless communication system according to claim 31 wherein the
interrogator is configured to output the forward signals at one of the frequencies.
33. (Original) The wireless communication system according to claim 31 wherein the remote
communication device is configured to communicate at one of the plurality of
frequencies responsive to a frequency of communication of the interrogator.
34. (Previously Presented) The wireless communication system according to claim 31
wherein the battery is substantially centered within the antenna comprising a loop
antenna.
35. (Original) The wireless communication system according to claim 34 wherein the
antenna is configured to receive the forward signals, and the remote communication
device includes another antenna substantially tuned to the frequencies and configured to
output the return signals.

36. (Original) The wireless communication system according to claim 34 wherein the antennas individually include an impedance reduction conductor.
37. (Original) The wireless communication system according to claim 31 wherein the remote communication device comprises a radio frequency identification device.
38. (Currently Amended) A wireless communication method comprising:
providing a remote communication device having an antenna simultaneously substantially tuned to first and second different frequency bands; and communicating wireless signals using the antenna, including at least one of:
receiving wireless signals at a frequency within one of the frequency bands, and
outputting wireless signals at a frequency within one of the frequency bands; ~~and~~
wherein the antenna is not tuned to at least one frequency between the first and the second different frequency bands, and the antenna includes an impedance reduction strip integrated within the antenna to facilitate tuning to the first and second frequency bands.
39. (Original) The method according to claim 38 wherein the providing comprises providing a remote communication device having the antenna configured to electromagnetically communicate with a return loss of less than or equal to approximately -9 dB within the first and second frequency bands.
40. (Original) The method according to claim 38 wherein the providing comprises providing a remote communication device having a plurality of antennas individually substantially tuned to first and second different frequency bands.

41. (Original) The method according to claim 40 wherein the communicating comprises receiving using one of the antennas and outputting using another of the antennas.
42. (Original) The method according to claim 38 further comprising processing wireless signals using the remote communication device.
43. (Original) The method according to claim 38 wherein the providing comprises providing a radio frequency identification device.
44. (Currently Amended) A wireless communication method comprising:
providing a remote communication device having an antenna configured to
simultaneously communicate at a plurality of resonant frequencies;
communicating wireless signals using the antenna, including at least one of:
receiving wireless signals at one of the frequencies, and
outputting wireless signals at one of the frequencies; and
tuning the antenna to the frequencies using a power source and an impedance reduction conductor.
45. (Original) The method according to claim 44 wherein the providing comprises providing a remote communication device having the antenna configured to electromagnetically communicate with a return loss of less than or equal to approximately -9 dB at the plurality of frequencies.
46. (Original) The method according to claim 44 wherein the providing comprises providing a remote communication device having a plurality of antennas individually substantially tuned to the plurality of frequencies.

47. (Original) The method according to claim 46 wherein the communicating comprises receiving using one of the antennas and outputting using another of the antennas.
48. (Original) The method according to claim 44 further comprising processing wireless signals using the remote communication device.
49. (Original) The method according to claim 44 wherein the providing comprises providing a radio frequency identification device.
50. (Previously Presented) A radio frequency identification device communication method comprising:
affixing a radio frequency identification device to an object to wirelessly identify the object via wireless signals at a plurality of frequencies using at least one antenna of the radio frequency identification device, the at least one antenna being simultaneously substantially tuned to the frequencies but not tuned to at least one frequency between two of the plurality of frequencies;
receiving forward signals at one of the frequencies; and
outputting return signals at one of the frequencies.
51. (Previously Presented) The method according to claim 50 wherein the providing comprises providing the radio frequency identification device having the one antenna configured to output the return signals.
52. (Original) The method according to claim 50 further comprising processing wireless signals using the radio frequency identification device.

53. (Original) The method according to claim 50 wherein the receiving and outputting occur at the same frequency.
54. (Previously Presented) A wireless communication method comprising:
communicating a forward link signal at one of a plurality of frequencies using an interrogator;
receiving the forward link signal using one antenna of a remote communication device substantially tuned to the plurality of frequencies;
outputting a return link signal using another antenna of the remote communication device substantially tuned to the plurality of frequencies; and
tuning the one antenna to one of the frequencies using a power source.
55. (Original) The method according to claim 54 further comprising processing wireless signals using the remote communication device.
56. (Original) The method according to claim 54 wherein the receiving and outputting comprise receiving and outputting using a radio frequency identification device.
57. (Currently Amended) A method of forming a radio frequency identification device comprising:
providing communication circuitry configured to at least one of receive forward signals and output return signals; and
forming at least one antenna to simultaneously communicate at a plurality of resonant frequencies, the at least one antenna not tuned to at least one frequency between two of the plurality of resonant frequencies; and coupling the at least one antenna with the communication circuitry.

58. (Previously Presented) The method according to claim 57 further comprising coupling a power source with the communication circuitry.
59. (Original) The method according to claim 57 wherein the providing comprises providing radio frequency identification device communication circuitry.
60. (Original) The method according to claim 57 wherein the coupling comprises coupling a plurality of antennas with the communication circuitry, one of the antennas being configured to receive wireless signals corresponding to the forward signals and the other of the antennas being configured to communicate wireless signals corresponding to the return signals.
61. (Previously Presented) The method according to claim 57 wherein the coupling comprises coupling the at least one antenna comprising a dipole antenna.
62. (Currently Amended) A radio frequency identification device communication method comprising:
providing an interrogator;
communicating a forward signal at one of a plurality of frequencies using the interrogator, the forward signal having a forward range;
providing a radio frequency identification device configured to communicate with the interrogator;
receiving the forward signal using ~~one antenna~~ a first antenna of the radio frequency identification device;
processing the forward signal using communication circuitry of the radio frequency identification device after the receiving; and

generating a return signal using the communication circuitry, after the processing, using ~~another antenna~~ a second antenna of the radio frequency identification device, the return signal having a return range larger than the forward range.

63. (Previously Presented) The remote communication device according to claim 1 further comprising a power source positioned with respect to the antenna to tune the antenna to one of the first and the second different frequency bands.
64. (Previously Presented) The remote communication device according to claim 4 wherein the antenna comprises a loop antenna and the power source is centered with respect to the loop antenna.
65. (Previously Presented) The remote communication device according to claim 11 further comprising a power source positioned with respect to the antenna to tune the antenna to one of the substantially resonant frequencies.
66. (Previously Presented) The radio frequency identification device according to claim 18 further comprising a power source positioned with respect to the antenna to tune the antenna to one of the plurality of frequencies.
67. (Previously Presented) The radio frequency identification device according to claim 22 wherein the battery is centered with respect to the loop antenna to tune the loop antenna to one of the frequencies.

68. (Previously Presented) The radio frequency identification device according to claim 26 further comprising a power source positioned with respect to the antenna to tune the antenna to one of the plurality of frequencies.
69. (Previously Presented) The method according to claim 38 further comprising tuning the antenna to one of the first and the second different frequency bands using a power source.
- 70-71. (Canceled)
72. (Previously Presented) The method according to claim 57 wherein the substantially tuning comprises using a power source.
73. (Previously Presented) The remote communication device according to claim 1 wherein the antenna is substantially tuned to the first and second different frequency bands having different respective carrier frequencies.
74. (Previously Presented) The remote communication device according to claim 1 wherein the antenna is configured to communicate at different substantially resonant frequencies corresponding to signals generated using at least one interrogator and which have different carrier frequencies.
75. (Previously Presented) The radio frequency identification device according to claim 18 wherein the plurality of frequencies correspond to different carrier frequencies of the communication signals.

- 76. (Previously Presented) The radio frequency identification device according to claim 22 wherein the first and second antennas are individually substantially tuned to the plurality of frequencies comprising carrier frequencies of the communication signals.
- 77. (Previously Presented) The radio frequency identification device according to claim 26 wherein the frequencies comprise carrier frequencies of the forward and return signals.
- 78. (Previously Presented) The wireless communication system according to claim 31 wherein the antenna is substantially tuned to the frequencies comprising carrier frequencies of the forward signals and the return signals.
- 79. (Previously Presented) The method according to claim 38 wherein the first and the second different frequency bands have respective different carrier frequencies and frequencies of the frequency bands do not overlap one another.
- 80. (Previously Presented) The method according to claim 44 wherein the antenna is configured to communicate at the resonant frequencies corresponding to a plurality of different carrier frequencies.
- 81. (Previously Presented) The remote communication device according to claim 1 wherein the communication circuitry is configured to control reflection, by the antenna, of electromagnetic energy present at the remote communication device to implement backscatter communications.
- 82. (Previously Presented) The remote communication device according to claim 4 wherein the power source comprises a battery.

83. (Previously Presented) The remote communication device according to claim 10 wherein the impedance reduction portion is configured to substantially tune the antenna to the first and second different frequency bands.
84. (Previously Presented) The remote communication device according to claim 83 wherein the antenna comprises an dipole antenna, and the impedance reduction portion is integrated within one half of the dipole antenna.
85. (Previously Presented) The wireless communication system according to claim 31 wherein the interrogator is configured to output a continuous wave signal and the remote communication device is configured to backscatter modulate the continuous wave signal to output the return signals.
86. (Previously Presented) The remote communication device according to claim 84 wherein a second half of the dipole antenna includes no impedance reduction conductor.
87. (New) The method of claim 62, wherein the first and second antennas of the radio frequency identification device are tuned to first and second non-overlapping frequency bands respectively.